

REMARKS

In response to the Office Action dated February 23, 2006, the claims have been amended to clearly indicate that the present invention provides a method of using a Web connection to directly control the signals that the I/O modules send to the industrial process. In light of these amendments, the rejection of claims 1-22 is respectfully traversed.

BACKGROUND

The present invention is intended to allow Web-based control of an industrial process during the initial setup and troubleshooting of the industrial control system, prior to the time when the programmable logic controller (PLC) may be fully operational. See generally paragraph [0011]. The invention provides this Web-based control without burdening the PLC. See generally paragraph [0011]. As is understood in the art, the PLC is the device that executes the control program used to control the industrial process or machinery.

In order to achieve these benefits, as well as the reliability necessary in an industrial controller, the present invention provides a mechanism for preventing conflict between the PLC and Web-based control of output ports. Whereas multiple units may read data from I/O without conflicts, conflicting output to the I/O and to a running machine or process can be a problem. Further, as we are now recognizing, connecting a control system to the Web, raises the risk of unauthorized access to the control system, particularly when the PLC may be bypassed for direct access to the I/O modules. For this reason, the present invention also provides a write control mechanism allowing the PLC to block Web access to I/O on a selective basis.

AMENDMENTS

The independent claims 1, 12 and 14 have now been amended to expressly recite that the Web interface of the present invention allows data to be received from the Web to define the electrical signals sent by the I/O modules to the industrial process. Support for this limitation is found, for example, at paragraphs [0044] and [0045] and described generally at paragraph [0012], and is specifically the subject of claims 2 and 13.

PRIOR ART

The cited reference of Lindar describes a system that monitors I/O data, but does not control the signals that the I/O modules output. Importantly, and as agreed by the Examiner and Applicant, Lindar does not teach controlling the output of the I/O modules without intervention of the PLC.

This deficiency of Lindar is not remedied by Papadopoulos. While Figs. 2 and 3 of Papadopoulos show an electrical path between the Web server 30 and I/O modules 40 via a back plane 34, Papadopoulos clearly indicates that the Web server 30 communicates exclusively with the PLC 32 and in no case communicates directly with the I/O modules 40. This can be seen at col. 4, lines 39-53, cited by the Examiner and is more clearly at col. 6, lines 1-3, which describe the mechanism for PLC/Web communication as being through a dual port memory 38. Col. 5, lines 24-52, also indicates that the mechanism for communication is restricted to be between the Web server and the PLC.

Lindar and Papadopoulos teach away from the present invention, both by failing to describe direct communication between the Web and the I/O modules to control the output of the I/O modules, and by failing to describe a mechanism to prevent potential conflicts between Web based writing of I/O and PLC based writing of I/O.

While not cited against the independent claims, the Examiner has cited Ichimura as providing a teaching reference for the conflict prevention mechanism of the present invention. Applicant believes there is insufficient teaching in Ichimura for this combination. Ichimura, judged from its abstract, is intended to protect against software faults in a single machine, not against conflicts between two machines without software faults. Further, the control of outputs described in Ichimura seems to be based on criteria other than a possible conflict. Applicant recognizes that the disabling of outputs is generally known in the art, but a PLC controlled disabling of outputs dependent on their source as from the Web, is not fairly suggested or taught by any of the cited references. Even in combination, it is believed that these references do not provide sufficient enablement for how the combination would be effected.

In light of these comments and remarks, it is believed that claims 1-22 are now in condition for allowance, and allowance is respectfully requested.

Respectfully submitted,
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